



NATIONAL SCIENCE FOUNDATION
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Dear Colleague Letter: Supporting Research Advances in Microbiomes

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Advances in the study of the complexity of the microbial world and the microbes that live in, on, and around plants and animals (the microbiome) are rapidly impacting the fields of human health, food and agriculture, energy, water and environmental resources, and driving industrial innovation.

With this Dear Colleague Letter (DCL), the National Science Foundation's (NSF) Directorate for Biological Sciences is announcing its vision to support and encourage microbiome research across the phylogenetic spectrum and biological scales; from host - microbe interactions to ecosystems. NSF BIO will also foster the development of a national research infrastructure to support collaborative science on microbiomes. A Fast Track Action Committee on Mapping the Microbiome (FTAC-MM) established by the National Science and Technology Council (NSTC) in February of 2015 concluded that contemporary microbiome research is "uncovering an unprecedented potential for the application of microorganisms to human, plant, animal, and environmental health; renewable energy production; water treatment; and manufacturing." The report further identified three areas of need based on previous Federal investments that conform to the objectives and mission of the BIO directorate. This multi-divisional effort is part of the BIO's continuing investments in the study of the microbiome and is an effort that involves funding through core programs and special solicitations.

NSF BIO encourages proposals that advance discovery in the realm of microbiomes with support through several programs in fiscal year 2017. These programs cross the entire BIO Directorate and span basic science through translational research that addresses pressing global challenges and support the development of tools needed for the 21st century.

Development of tools and infrastructure to enable new areas of microbiome research will be supported through programs such as the **Enabling Discovery through GENomic tools (EDGE)** in the Division of Integrative Organismal Systems (IOS). The first EDGE awards will be made in FY2017 and encourage the development of tools that can impact broad communities of investigators. Projects of interest could include but are not limited to: elucidating fundamental principles by studying multiple microbiomes and across different ecosystems, and the development of computational and modeling tools for studying microbiomes.

Research proposals in plant - microbe symbiosis and the phytobiomes are being encouraged for support through the new Plant Biotic Interactions (PBI) program jointly supported by NSF BIO and the USDA National Institute for Food and Agriculture. The first awards in this program will also be made in FY2017. The scope of the PBI program extends from fundamental mechanisms in model systems to translational efforts that advance agriculture. Exploratory projects that enable the development of [breakthrough technologies for animal and plant phenomics and microbiomes](#) are being supported through the EAGER mechanism in collaboration with USDA/NIFA, with awards expected in late FY2016.

The Symbiosis, Defense and Self-recognition (SDS) program in IOS supports research in animal -

microbe interactions and animal microbiomes as well as symbiotic interactions among microbial communities. SDS also supports research on the virome and animal health and the origins of emerging infectious diseases, an area identified of underinvestment by the FTAC-MM.

Within the Division of Environmental Biology (DEB) all four program clusters (Population and Community Ecology, Evolutionary Processes, Systematics and Biodiversity Science, and Ecosystem Science) support microbiome-related research, in addition to two special programs: Dimensions of Biodiversity and Ecology and Evolution of Infectious Disease.

Within the Division of Biological Infrastructure (DBI), the Advances in Biological Informatics (ABI) program supports the development of robust cyberinfrastructure and informatics tools to support the large data analyses as these relate to microbiome research.

In the Division of Molecular and Cellular Biosciences (MCB), the Systems and Synthetic Biology Cluster support the application of quantitative and interdisciplinary tools to the study of microbial communities and the microbiome.

Investigators are encouraged to visit the NSF website (<https://www.nsf.gov>) for funding opportunities, guidelines, and due dates for these programs. NSF will continue to release Dear Colleague Letters and Solicitations as the microbiome campaign continues into the future.

For more information or questions, please contact one of the following:

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Sincerely,

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